

Stucco, c. First Century A.D., found near the Villa Farnesina, Rome, during the Canalisation of the Tiber in 1879.

PLASTER DECORATION.

By J. D. CRACE [*H.A.*].

Read before the Royal Institute of British Architects, Monday, 14th March 1904.

PROBABLY few of the arts are really older than the plastic, and it is but in the nature of things that the remains should be few when the work was executed in any material extremely friable, and which, when once exposed to the vicissitudes of weather, was readily disintegrated. On the other hand, when hardened by fire, as in pottery, and proof against the action of time and moisture, liable only to fracture, it remains as evidence of the arts of the most remote antiquity.

It is, however, reasonable to suppose that such fictile substances as clay were wrought into form by human hands to human fancies, even before man learned to bake earthen vessels; and we may fairly assume that the child's delight in mud pies is but the survival of an instinct born with the very earliest babies.

During what vast ages did the dwelling-house continue to be built of mud, moulded into bricks for the convenience of building walls, and dried in the sun? It would be contrary to all that we know of man, even in a very barbaric state, to suppose that century after century these mud-walls were left rough and bare, within and without; void of all attempt at ornamentation, where the material itself offered such facilities. But we have to remember that houses so built, of unbaked mud, continued to be the residential form of building for the masses of the population, even during a very high state of civilisation; and we may feel pretty sure that the houses which for generation after generation were built, and were resolved after a time into their original mud, contributing to form the great mounds which mark their ancient sites, were not devoid of some internal finish and ornamentation. Their decorations have necessarily perished with them.

Nevertheless, we can almost assume that, such as they were, they were prototypes of what followed them: that, little by little, types were formed. It takes ages to form types of ornamentation, and they endure for ages. If we try to think back to what the progress may have been, we can see that after the mud-brick walls were formed, the surface must soon have been "rendered" with a coating of the same convenient material, which would, whilst still moist, readily receive any impress. Inevitably it would receive accidentally the imprints of the workman's hand. His rough tools would leave marks at the beginning and end of each stroke, as he laid on or smoothed his layer of mud; and a chance symmetry would lead him to intentional device, impressed by his fingers or traced by the end of a stick.

From such simple beginnings the practice would soon grow—and probably did grow, as independent developments—along the great waterways of the old world.

Meanwhile, nobler and more permanent forms of building had been found possible by those who could command the combined efforts of the many; and stone took the place of the humbler material for the greater edifices required for defence, for worship, or for sovereignty. The use of stone led to the demand for some material which would adhere to stone, and give a uniform surface; and this was found in simple compositions, having burnt lime as the binding ingredient.

As mortar, or as plaster, such compositions must have been in continuous use; and it is more than likely that many a mud-built house had its inner walls coated with a lime-plaster which, whilst as easy to work as the mud or clay, and as easily impressible, set to a fine and hard surface, and admitted of the added joy of colour. But this also would perish with the mud walls.

Plaster, in the form of a very fine, smooth coating of what we should call lime-putty, was used to give a finished surface to the stone walls or columns of the temples and tombs of Egypt in very early times; but does not seem to have been much used plastically for ornamentation. It was similarly used by the Greeks; and the evidence of its use decoratively by them is mainly inferential. It does seem to me reasonable to infer that as they certainly used the material, and as certainly used moulded terra-cotta ornamentally in their buildings, they probably did make some use of moulded stucco for ornamental details before they had acquired the art of sculpture.

This appears all the more probable because, by tradition, their sculptured ornament was always to be found in such protected positions as might suit a material liable to injury, as, for instance, in the metopes and friezes; and modelling must have been long and habitually practised before it was thought worth while to bake the results; and perhaps before the tools existed which could make sculpture in hard stone possible.

But there is another reason for inferring that stucco may well have been used decoratively in an early period of Greek history. It was in use to great perfection, at no great distance, and at a period long antecedent to anything hitherto known of Greek art.

Two or three years ago we all supposed that until the rapid perfection of Greek art, between the sixth and fourth centuries before Christ, the strictly conventionalised art of Egypt, and perhaps of Assyria, represented the only advance of art to any worthy position. Then came the excavations at "Knossos," in Crete, by Mr. Arthur Evans, and our whole notions on the history of art have to undergo a change. Among the many wonderful revelations of those excavations none are much more surprising than the stucco decorations in relief with which some of the walls had been decorated. A valuable opportunity of examining the reproductions of these and other treasures from the same site was given in the winter exhibition of the Royal Academy a year ago. And it was only in December, 1902, that Dr. Evans gave this Institute a very full description of the results of his work, many of the illustrations to which were

given in your JOURNAL.* I will therefore remind you that among those illustrations are some showing fragments of a plaster ceiling ornamented with a repetition pattern of connected spirals in relief, decorated in colour; and that the collection shown at the Royal Academy included the casts from a bull's head almost worthy of the Parthenon frieze; and of the torso of a man, nearly life-size, exhibiting a remarkable artistic knowledge and vigorous power. Both these were parts of the stucco decorations of the walls, and were in low relief and coloured.

According to the best authorities, the palace of which these were decorations was destroyed in the fifteenth century before Christ—a thousand years before Greek art emerged from a lifeless archaism.

There is surely something almost appalling in these evidences of the triumphs of man in art, knowledge, and civilisation, at epochs remote, and then again remote—always to be followed by vast submerging waves of decadence, destruction, oblivion, silence. But if we possess little trace of the early use by the Greeks of decorative plaster work, we know their skill in modelling during all their best periods, and we fortunately possess examples of what their successors could do after the Roman conquest of Greece.

Beautiful specimens of decorative stucco work have from time to time been unearthed in excavating the ancient sites of Rome and the surrounding country. The Baths of Titus, when discovered at the beginning of the sixteenth century, proved a mine of decorative art; and, as we shall see later, the delicately modelled stuccos, no less than the painted ornaments, became the admired exemplars for the great masters of decorative art at the very time when Renaissance art reached its highest perfection. Since that time what hidden treasures have been brought to light! Herculaneum and Pompeii, from the fact of their being suddenly buried as they stood, have given us details which could never have survived a more protracted decay; whilst the number of isolated discoveries has been considerable, as in a tomb at Cervetri, where the relief decorations are partly cut in the tufa, and partly formed in stucco.

When in Rome, in the spring of 1859, I saw two sepulchral chambers on the Via Latina, which had been discovered a few months before. Their vaulted ceilings [fig. 1] were elegantly ornamented with stucco in low relief, panelled with mouldings and medallions, all executed with a delightful freedom and delicacy. Within the medallions, figures of children or animals, modelled *in situ*; the relief slight, the touch free, the design completed or expressed here and there by an outline indented in the ground. A few simple colours were used between the mouldings to express the division of the surface. The date of the structure is about A.D. 160, as indicated by the *signa tegularia* on the bricks.

Within the last few years also have been found, in the Farnesina grounds, the buried remains of buildings ornamented with stucco reliefs of an elegance and a refinement of execution quite unsurpassable [see *headpiece*]. One great value of these works is the lesson they teach in the adjustment of the actual treatment in execution to the nature of the material. The whole surface speaks aloud of the ready and dexterous use of fingers and tools on a light plastic material. It is most instructive to compare the treatment of the carvings in stone or marble found in the same excavations. In these the execution is firm and crisp, the design relieved here and there by strong shadows; whereas, in the plaster ornament, there are no strong shadows, only enough—barely enough—to express the design. One almost imagines the stucco yet moist, still impressible to the touch. It is as if some fairy goddess had found it soft, and lightly fingered it. There is a sense of evanescence about it, whilst the charm of perfect attainment remains.

Let us now turn for a time to a very beautiful but very different growth of plaster

* 20th December 1902, No. 4, Vol. X.

decoration—that which was developed under the Mohammedan conquerors. In the last quarter of the ninth century of our era was erected the great Mosque of Ibn Tooloon at Cairo. Its brick walls were entirely coated with plaster, and on the same material were executed all its

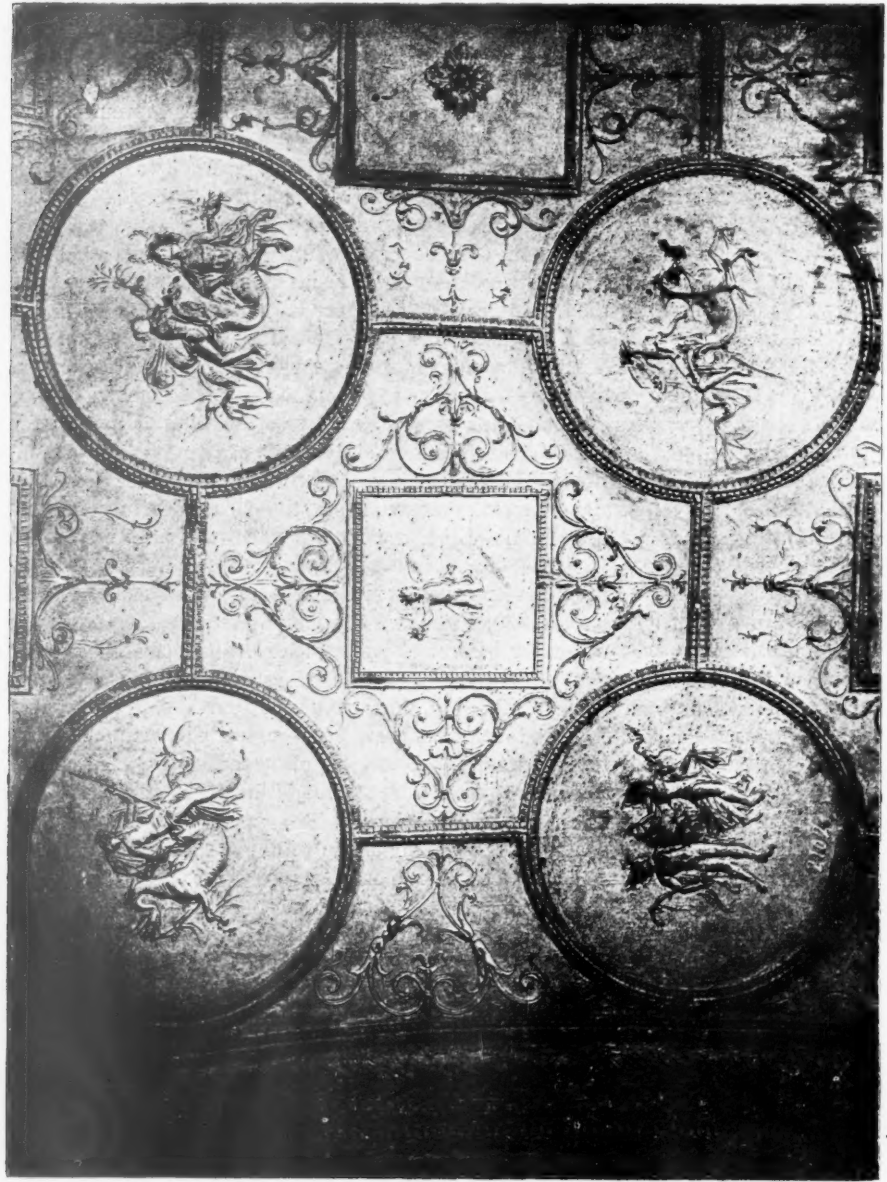


FIG. 1.—CEILING DECORATION, LOW RELIEF IN STUCCO. FROM THE PAINTED TOMBS ON THE VIA LATINA, ROME.

beautiful decorations [fig. 2]. These are repetition castings, and take the form of bands, or borders, of admirably designed conventional ornament, which frame the pointed arches and are continued as "imposts" connecting them. Others are used as friezes above the arches; the wooden plate which carries the roof being carved with inscriptions in Kufic character and forming a cornice. Long exposure to the weather seems to have destroyed all trace of the colour and gilding with which it was doubtless illuminated; but it remains a very valuable early example of a refined and dignified use of simple means. Even the capitals of the angle shafts of the piers are cut or cast in plaster.

Another building, erected about a century later, but in a very ruinous state, the Mosque of El Hakim, still retains some remains of its external plaster decorations, as well as of the friezes of Kufic inscriptions, worked in plaster, which ornamented its interior walls.

Without pursuing the subject through all its periods in the Arabic art of Egypt, it should be mentioned that plaster continued to be used there as an important factor in decoration, both external and internal, throughout the developments of its architecture during the next five centuries. The ornamentation of the domes, both inside and outside, is not a little remarkable. The use of a fine stucco, or gesso, in low relief ornament, as a preparation for gilding and colour on the wooden beams of its flat roofs, should also be noticed.

But of a wider celebrity, and more easy of access to us, is that wonderful footprint of the Moor in Spain—the palace of the Alhambra. Here is the very apotheosis of plaster: of plaster casting, carried, perhaps, to an excess of richness and elaboration, but never losing its true quality of ornament designed purposely for casting.

As more or less elaboration is intended, the ornament is designed in one, two, or three strata. That which projects most is the simplest, the leading motive, and the *encadrement* of



FIG. 2.—MOSQUE OF IBN TULOON, CAIRO.

the more complex ornament of the next stratum. The latter, often enriched on the surface, winds in and out of this bolder form, filling the intervals, but never disturbing its outline. With all its elaboration it will "draw from the mould" at one operation. Surely, there is something to be learnt here. It is not necessary to follow Moresque design in order to pursue a legitimate principle, but it is evident that very beautiful effects are possible with very simple means, and with a very simple material. The important thing is to understand *why* so much can be attained by a mere repeat casting. I think it is mainly because (1) the designers thoroughly understood grace of line and how to fill their spaces. (2) They never lost sight of the fact that the work was to be cast. (3) Most important of all, the repetition did not include the representation of natural objects, for it is where representations of nature are concerned that repetition is offensive.

As you know, this plaster-work was made glorious with colour. The other wonderful details and accessories of the building show how little economy had here to do with the use of plaster. In more truly European art we get little glimpse of the decorative use of stucco during the mediæval times until the fifteenth century, when it became important. A very original and striking example, belonging to the middle of that century, is to be seen in the drum of the dome of San Eustorgio at Milan. This space is occupied by a series of twenty standing angels in high relief, varied in attitude, and supporting a cord, from which are suspended curious bell-shaped bouquets of flowers and foliage; the whole placed against a flat arcading. Above and below these are flatly moulded cornices, whilst the wall lunettes are framed by bands of low relief ornament and a frieze of cherubs' heads. This is the work of that able sculptor-architect, Michelozzo Michelozzi, of Florence, and is said to have been executed in 1462.*

In the second half of the fifteenth century we find Bernardino Pinturicchio making considerable use of low relief enrichments, not only for the mouldings with which he divided the surfaces which he had to decorate, but as ornamental features within the paintings themselves, a practice much condemned by Vasari, as making the things which should be subordinate the most prominent. Those, however, who have seen his works in the "Appartamenti Borgia" of the Vatican,† and in the famous "Libreria" at Siena, must allow that, from the decorative point of view, Pinturicchio knew what he was about. In what material these relief enrichments were executed, I am not sure; it certainly admitted of being prepared in moulds and affixed to the work; and, when I last visited Siena, I was interested to observe that the band of richly-coloured interlaced ornament, which divides the ceiling vaulting in the last-named work, had in one place become detached, and that the relief ornament was, in that case, mounted upon a thin ground of linen or paper, which had been bent to the shape and so affixed to the plaster vaulting.

Within a few years after this, Bramante was at work on St. Peter's; and, in summing up his life and his services to architecture, Vasari says that "His continual investigations frequently resulted in the discovery of some useful invention whereby the art was largely enriched. Among other instances of this was the method of vaulting with gypsum and that of preparing stucco, both known to the ancients, but the secret of which was lost in their ruin, and had remained concealed even to the time of this master" (II. 442). Elsewhere he mentions that the stucco Bramante used at St. Peter's was "of limestone and puzzolana."

* An excellent coloured model of this dome, made by Consolani, to a scale of $\frac{1}{10}$, is in the South Kensington Museum.

† In speaking of the stucco ornaments in the Borgia apartments of Bernardino Pinturicchio, Vasari also says: "But the methods now practised in stucco were not known at that time, and the above-mentioned ornaments are for

the most part ruined." This must have been a somewhat exaggerated statement. At any rate, they have been very efficiently repaired, and can be judged of to-day. A very beautiful model of one of these apartments, to a scale of $\frac{1}{10}$, is in the South Kensington Museum, and that of another, in the Museum at Edinburgh.

A very complete account of the source from whence were derived the delicate stucco decorations in the Vatican Loggie and the Villa Madama is to be found in Vasari (V. 19), who narrates how Raffaello and Giovanni da Udine went together to see some subterranean chambers then just discovered in excavating the Baths of Titus. "These were covered all over with minute grottesche, small figures, stories and ornaments executed in stucco of very low relief. With these minute ornaments in stucco were mingled portions in colour of the most varied beauty." Both Raffaello and Giovanni "were seized with astonishment at the freshness, beauty, and excellent manner of these works," and so much was Giovanni impressed by them "that he devoted himself wholly to the study thereof," and reproduced them "with so much grace and facility, that nothing more was now wanting to him than the knowledge of the manner in which the stucco was compounded."

"Many before his time had," says Vasari, "used a composition made of gypsum, chalk, Greek pitch, wax, and pounded bricks, which they had then gilded with gold.* But they had not succeeded in discovering the true method of making stucco similar to that used on the works discovered in the ancient grottoes and chambers." That which was being used in St. Peter's was, he says, "of limestone and puzzolana" in moulds of clay; but with this he could not obtain the delicacy and fineness of the antique, nor the whiteness of colour. He therefore first tried pounded travertine instead of the puzzolana, but found this gave "rather a livid than a pure white." Finally he compounded finely powdered white marble with the lime from white travertine, "and found that he had thus indubitably succeeded in producing the stucco of the ancients, with all the properties that were to be desired therein."† He showed the results to Raffaello, "who at once caused Giovanni to decorate all the vaultings of the Papal Loggie with the most beautiful ornaments in stucco. The whole work was executed in mezzo and basso-relievo, the decorations being varied by stories, landscapes, foliage and other fancies." He goes on to say that "these works of Giovanni, for the beauty of their design, for the richness of invention displayed in the figures, and for the colouring, whether in stucco or painting, are indeed to be preferred to the ancients"; and he proceeds to expatiate on the truth and charm of the painted details from natural objects which Giovanni represented there; and the same treatment was adopted in the decorations of the Villa Madama.

Mrs. Merrifield quotes from the "Marciana Manuscript" (in the Library at Venice) the actual recipe for this stucco, as given by a sculptor, Jacopo Tatti (di Monte S. Savino), who had tried it. He had been at Florence with Giovanni da Udine, and had also been at Rome under Julius II. The proportions were: "finely powdered travertine 5lbs., and if you would have it finer and more delicate, take fine marble instead of travertine, and 2lbs. of slaked lime. Mix them together with water, and beat them well together like a fine paste, and execute what works you please with it, either by forming it with your hands, or in moulds, and dry it in the shade." The writer proceeds with instructions for making it white by using fine powder of white lead and lime on the damp surface; but this was probably only required when the travertine was used. We have here therefore extremely detailed information as to the material employed on two of the most famous and important works of the period of the zenith of Italian art.

But Giovanni was by no means the only—nor even the chief—stucco worker among that wonderful band of young artists in the Vatican. If his delicate skill was paramount in the

* The composition here given by Vasari seems incongruous. I suggest as possible that the Greek pitch and wax were used for the moulds; while the gypsum, chalk, and pounded bricks were the ingredients of the stucco.

† Probably guided by some reference to Pliny or Vitruvius. The work of the latter had then been recently printed for the first time.

beautiful little medallions in which he emulated the ancients, to his fellow-worker, Pierino del Vaga, must be assigned even a higher place. Of all the artists in that wonderful group, Piero was the one whose work, whether in relief or in colour, shows him to have had the finest decorative perceptions. As an ornamentist, and as a decorative colourist, he stands pre-

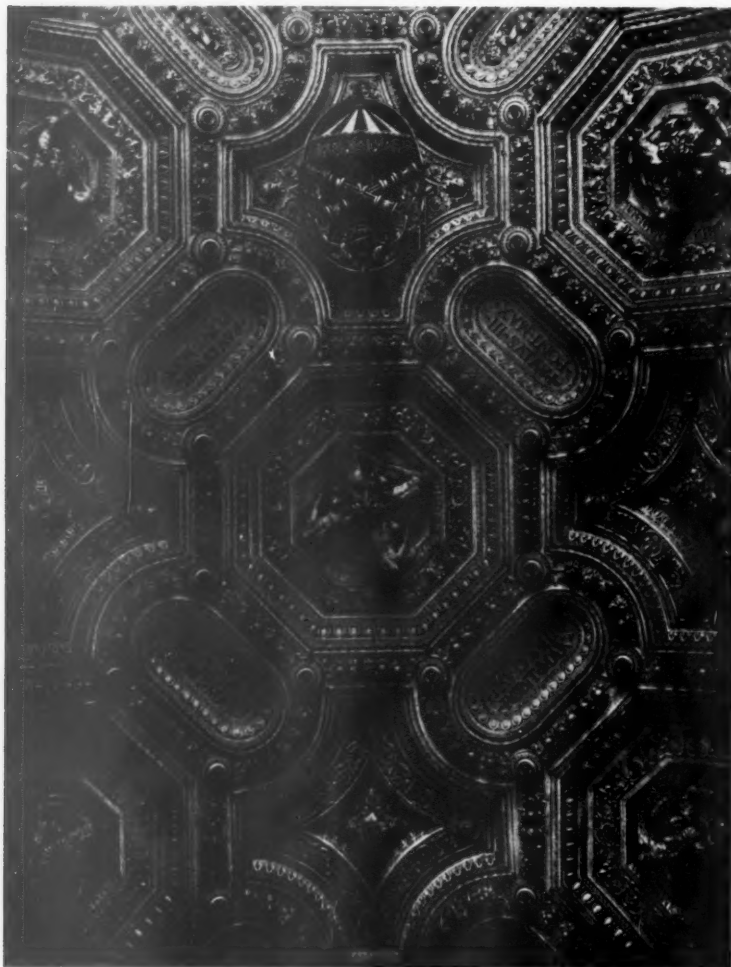


FIG. 3.—CEILING OF THE SALA REGIA, VATICAN.

eminent, and his stucco-work has a quality of fine decorative appropriateness, both in design and scale, that has been surpassed by none. Of his bolder conceptions the great ceiling of the Sala Regia is a fine example [fig. 3]. It is of this work in stucco that Vasari exclaims, "of a truth it may justly be affirmed to have surpassed all that has ever been done in that manner by the ancients or moderns." Of work on a smaller scale he executed much in the Vatican Loggie and elsewhere. His decoration of the little Loggia of the Doria Palace at Genoa I look upon as one of the most perfect decorative works in all Italy. "He was beloved by Raffaello as a son," says the old chronicler.

The use of stucco decorations increased during the sixteenth century, not only in

Italy but throughout all those States to which her influence extended; but, before quitting Italy, one or two of the artists who became famous for its use in the later half of that century should be mentioned. Of these Alessandro Vittoria is one of the best known, and his work under Sansovino at Venice, in the Libreria (lately damaged by the fall of the great Campanile), and in the "Scala d' Oro" of the Ducal Palace, said to have been completed in 1577, are characteristic examples of his style. There are, of course, hundreds

of examples by less known men, or by artists now unknown, scattered through all the cities of Italy.

There is one of a high order, of which I have never seen mention, in the church of Sta. Maria delle Grazie at Milan. The lower wall of the fifth chapel to the right, on entering the church, is decorated in low relief with the figures of four angels, about six feet high, supporting garlands or festoons of flowers and foliage—the whole surmounted by a frieze and cornice, above which are the fresco decorations. This is a very graceful and beautiful work attributed by the local custodian to Vincenzo Vicentino, the gem engraver, of the latter part of the sixteenth century, but on what authority I am not aware.

But it was some forty years or more before the completion of these last-named works that Francis I. had attracted to France some of the most capable of the Italian artists who were skilled in stucco. Of these Primaticcio and Il Rosso came to France about 1530, and, whilst producing the wonderful stucco decorations of Fontainebleau [fig. 4], influenced French design and French sculpture for many a day. They were followed, twenty years later, by Niccolò dell' Abbate, to whom came also his three sons, the youngest becoming, after a time, the director or manager of these decorative works. Certainly it would be impossible to make



FIG. 4.—SOME OF PRIMATICCIO'S WORK, GALLERY OF FRANÇOIS I., FONTAINEBLEAU.

plastic art of a high order take a larger share in interior decoration. But I must own, though with much admiration for the art and grace of the separate parts, that the whole is overcharged, one may almost say overstocked, with those graceful, long-limbed figures. Their very number produces a sense of superfluity, and encumbers the judgment. But for the study of what may be done in stucco it is a fine field for the student; and it was the parent of the rich decorations of Louis XIV.'s reign, which, in their turn, became the model for civilised Europe [fig. 5].

But, at the same time when the French king, Francis, was so actively encouraging Italian artists to bring their talents to his Court, our own Henry VIII., his rival, had similar

ambitions, and was zealous to secure the services of able artists. In this he was very successful, many of those who came over being pupils or relations of those who were at work



FIG. 5.—"GALERIE D'APOLLOX," THE LOUVRE.

on the masterpieces of the Vatican, members of that famous band who had Raffaele as leader. Pietro Torrigiano was among the earliest. He completed the bronze monument to Henry VII. in 1519, and had died in Spain, a victim to the Inquisition, in 1522. It was to the Palace of Nonsuch, begun in 1538, that the new stream of talent was directed, and

although not a vestige of it now remains, the names of some of the men who adorned it are a guarantee that the work within and without was neither coarse nor commonplace,* and that the figures with which the stucco "histories" were peopled were far more graceful and refined in design than any which had previously been executed in England for decorative purposes. I am at a loss to understand why any question has been raised lately about their external panels having been worked in stucco. There is not really the smallest doubt on the subject. Not only did King Henry send for artists who could work in stucco, but John Evelyn, who was well trained to observe, who had travelled and studied in Italy, and knew the works done there, expressly states the fact. As to the improbability that such work would be done in plaster and left exposed, why, there are plenty of examples done more roughly, and within the next seventy or eighty years, which remain to this day, in spite of exposure and often neglect.

External decorative work in plaster continued to be a feature of many English houses, both in town and country, till the close of the seventeenth century. But it was, of course, the interior which was the more important field for such decorations, and from the time of Nonsuch onwards, through the hundred years following, no house of any pretence was without its elaborate plaster ceiling and frieze; and though many have perished—too often by fire—there can hardly be a county in England which cannot still show examples of fine panelled ceilings and chimney fronts, or of those ornamented with the scroll "strapwork" which was an English development. Many good examples exist in Scotland also.

I shall not dwell on the work of this period now, because it has been more fully studied and illustrated than any other. It came to an end in the reign of Charles I. Undoubtedly the English plaster work of that time was admirably suited for domestic work, and affords most useful suggestions.† I venture to offer, however, one or two criticisms as to its use. In the first place, to take as a model such a panelled ceiling of a moderately sized room, and to adapt it for a big room or hall by magnifying all its parts, appears to me to be a serious blunder. The work was never very refined in execution, and to magnify it is to make it coarse. Again, to mistake its defects for beauties is to lower the whole standard of art execution. But the other day I heard the wavy unevenness of surface and the broken line of mouldings spoken of as a valuable part of the excellence of these ceilings, with a lament that we did not so work now. This is a very spurious form of admiration. A broken or bulging wall is more "picturesque" than one built straight and plumb; but no one wants to build a wall bulging or broken on that account.

The fact is that, admirable in many ways as these old English ceilings are, few of the men who did them had either the art or the skill of the Italians who made ornamental plaster work popular. These latter endeavoured to make their work perfect in modelling and in finish. The figures introduced were true works of art. But in the English plaster-work of the time you can hardly find a figure that is not more or less barbaric in execution, and the minor ornament, effective as it is, is often greatly wanting in grace of line and in intelligent modelling. These things are *defects*; and while much charm remains, do not let us mistake the defects for the charms, and imitate imperfections which the original worker would gladly have avoided. Such Chinese conservatism is a dry-rot to any art.

Our next step in English plaster-work is one which leaves behind all trace of the

* "I much admired how it had lasted so well and intire since the time of Hen. VIII. exposed as they are to the aire; and pitty it is they are not taken out and preserv'd in some drie place; a gallerie would become them." Evelyn's Mem.: 3 Jan. 1666.)

† I may mention that two complete rooms, with the original ceilings and oak panelling, have now been fitted up in the South Kensington Museum.



FIG. 6.—DETAILS OF COVE, ROYAL HOSPITAL CHAPEL, KILMAINHAM (1684).

remaining Gothic influences, and takes us straight to the classic work of Jones and Wren. The gap caused by the Civil War made the change more complete; and the great building operations in London, after the Fire, opened the way to new men and new methods. Again were French and Italian plaster-workers invited to England in Charles II.'s reign, and



FIG. 7.—PLASTER CEILING, ROYAL HOSPITAL CHAPEL, KILMAINHAM, DUBLIN (1684).

examples of their work, or work done under their influence, may be found scattered through the country. Besides the work in St. Paul's, St. Stephen's Walbrook, and other City churches, the Chapel of Trinity College, Oxford, may be cited as a good typical specimen of the plaster ornamentation, as it is also a more than usually fine one of the woodwork of that time.

One feature, to be found in some of the plaster decoration executed towards the end of the seventeenth century, is the elaborate modelling of fruit, flowers, and foliage in full relief,

often in parts quite detached from the grounds, and supported either by wires embedded in the plaster or by small sticks of tough wood. I call to mind good examples at Euston Hall, in Norfolk, and at Barrington Hall in Oxfordshire, besides many in smaller houses; but the most important and characteristic is perhaps that in the chapel of the Royal Hospital at Kilmainham, built in 1680, of which, by the courtesy of Messrs. Jackson, who have lately renewed it, I am able to show a good illustration and a portion of the original work [figs. 6 and 7]. In this the smaller flowers were attached by means of the long thorns of the blackthorn, which have been used also in the new work. But this work, full as it is of artistic ingenuity and clever modelling, was, by that very ingenuity, departing from any true principles of stucco work, and therefore hastening the decay of the art.

The well-known ceiling of the Chapel (of King Charles the Martyr) at Tunbridge Wells (under which I sat for the first five years of my school life) is of much coarser execution, and was executed by Englishmen about 1703.

An excellent example of the Wren school is that in the board-room of the New River Company (1693) [fig. 8]. The foliage of the border panels is perhaps rather heavy for the height of the room—about 12 ft. 6 in.—but it is free and spirited. The alternation of the rose and sunflower rosettes, in the margin, reminds one of the same treatment in St. Paul's (carving of the west door architrave). The small subjects are modelled freely in a very Italian manner.

Another mansion, "Stansted," near Emsworth, built in 1687, but lately destroyed by fire, contained, besides some good carving of the "Grinling Gibbons" type, some fine and unusual plaster decoration. Fortunately the latter to some extent resisted the fire, and has been renewed by Messrs. Jackson under Mr. Reginald Blomfield's direction. The fine frieze of life-size children could still be seen *in situ*, as well as portions of the ornament. It does not seem to be known by whom these were modelled.

The next modification of style was largely due to Kent. In his designs the plaster ornamentation is mainly used as architectural enrichment, bold in treatment—sometimes too bold for the space; but effective in its way. He was an able designer, and many of his ceiling designs are extant. His work may be seen in Burlington House, Kensington Palace, Chiswick House, Houghton, and many country mansions.

Following closely on Kent's work came a flood of plaster ornament derived from the French work of the time (Louis XV.). This was sometimes really good; often straggling and purposeless, yet not without a certain elegance. There are still hundreds of drawing-room ceilings in London, from Lincoln's Inn to Mayfair, ornamented in this style (dating from 1730 to 1750). The best of it was at least partly modelled; but the greater part was cast and fixed. It rarely has either the grace or the finish of the French work of that time; and of Louis XV. ornament one must say, as of the little girl in the rhyme, that "when it was good it was very, very good; but when it was bad it was horrid." With this style practically stucco modelling came to an end. All that followed was cast and fixed. Just as, in France, the staid and somewhat prim style of Louis XVI. succeeded the exuberant treatment of that of his predecessor, so in England, the ornament but now described was succeeded by that which is connected with the name of the brothers Adam.

It is an instructive fact that the change was due to the same influence which had produced the detail of the Vatican Loggia and the Villa Madama, namely, that of the antique stucchi in the excavated ruins of Rome. The difference in the result is perhaps easy to account for: Giovanni da Udine studied them, as an artist, by endeavouring to produce similar work with his own hands. Robert Adam, as a draughtsman, copied them on paper, as did probably the Frenchmen through whom France adopted the style. It was undoubtedly elegant and the effect refined; and, since the method of reproduction was mechanical, it lent itself to

very extensive use. The number of town and country houses built in George III.'s time was enormous; and the examples of this form of plaster decoration proportionately numerous in England, Scotland, and Ireland. They often include very charming medallions, cast from good models, of heads, single figures, or groups, in the "classical" taste; and the arrangement and distribution of the ornament are usually excellent. It has the one defect that the touch of the hand is not upon it. It is too well known, and has been too largely illustrated, to make it necessary to give examples here. The latest of much merit are perhaps to be found in the houses of Portland Place.

I do not think that we need touch on the inconsequent vagaries which the next half century produced; and I turn with a shudder from any mention of the plaster Gothic vaulting and pinnacles of Strawberry Hill and its imitators. Much good plaster work has been done in the last half of the nineteenth century, but it has always been in the form of attempts, sometimes very successful, to reproduce a past style, and by casting. There is, however, one valuable innovation which must be noticed, namely, the introduction and constantly extended use, since 1861, of the "fibrous-plaster" method. For many kinds of plaster decoration it presents immense advantages. It does away with the great danger of enormous overhead weight, and requires so much the less timber structure to carry it; it can be executed quickly, and it dries quickly. These are important, though not the only advantages.

It is by no means so modern an invention as is often assumed. I remember seeing at Genoa, more than forty years ago (in the old Bank of St. George, I think), several large statues, of the sixteenth or seventeenth century, which were constructed of plaster and canvas on wooden framework.

Its modern use in England came about in this wise. A Frenchman, De Sachy, who had tried to work it in France and failed, was under some obligation to our old friend Owen Jones, who acquired an involuntary interest in it. Owen Jones sought my father's advice about it, and he accompanied Owen Jones to Messrs. Jackson, of Rathbone Place, and



FIG. 8.—CEILING OF THE BOARD ROOM OF THE NEW RIVER COMPANY'S OFFICES (1699).

strongly advised the latter to purchase the patent, which they did. It was not till after considerable practice in its use that they made it commercially successful; but it has now become, perhaps, the most important part of their work.

Ornamental work in plaster or stucco must always continue to be a very valuable means to the internal decoration of our buildings. Its artistic value will vary necessarily with the talent brought to bear upon it. Its facility is at once its recommendation and its danger. But it is perhaps well to be sometimes reminded that the simplest materials have not been scorned by the greatest men, and that the finished result of any art pleases, not only by the talent bestowed on it, but by the fitness of the limitations which the artist has imposed on himself.

I wish to acknowledge my obligation for assistance in the illustration of this Paper: to Messrs. Jackson, for the loan of photographs and examples; to Mr. Millar (deceased since this Paper was written), for his spontaneous offer of examples; to Mr. Mansell, for permission to make slides from his photographs; and to Mr. Searle, Secretary of the New River Company, for enabling me to photograph the ceiling of their interesting room. I am also indebted to the A. A. Camera Club, and to the staff of the Board of Education at South Kensington, for the loan of many excellent slides, some prepared expressly for me; to the latter Institution also for several valuable examples; and I have to thank Mr. Batsford for willing aid, but partially represented by a set of photographs of "Adam" ceilings.

And to those who may wish to pursue further the history of ornamental plaster and stucco-work, I may direct their attention, first, as regards the employment of foreign artists, to a very interesting and informing Paper by the late Sir Digby Wyatt, read at this Institute 18th May 1868, and to an excellent and concise Paper by Mr. G. T. Robinson, read here in 1891. Papers by Mr. Basil Champneys, and others, are to be found also in the JOURNALS of the Institute; and only last December a Paper of a more technical kind was read by Mr. G. P. Bankart before the Architectural Association. The well-known book by Mr. Millar, published in 1897, contains an introductory chapter, by Mr. G. T. Robinson, on the historical side of the subject, whilst the book itself is fairly exhaustive on the technical side, and lavishly illustrated.

J. D. C.

DISCUSSION OF MR. CRACE'S PAPER.

Mr. ALFRED DARRYSHIRE, F.S.A., *Vice-President*, in the Chair.

MR. R. PHENÉ SPIERS [F.], F.S.A., in proposing a vote of thanks, said he should like to express his own obligations to Mr. Crace for undertaking to bring this subject before the Institute. Although it had been treated on various other occasions in that room, he felt sure Mr. Crace would treat it in a new way, and bring to their knowledge new facts and new data, and also give a general historical survey which would be a valuable supplement to what had been done before. He was glad Mr. Crace had referred to mistakes made in some of the modern work, where the authors seemed to imitate defects, and looked upon them as beauties because they leaned to the picturesque. In one or two papers read before the Association, that appeared to be emphasised as a desirable attainment. Mr. Crace might have commended plaster work even more than he had done when he referred to those early crude brick walls as having probably received a coating of stucco—probably decorated. As a matter of fact it was to the plaster that the crude brick walls of antiquity owed their preservation. Even now, amongst the

ruins of Mesopotamia, in buildings dating back perhaps from 8,000 to 8,500 years B.C., were found walls covered with stucco, which owed their preservation in great measure to that material. In those days the walls as a rule were painted; he did not know whether sculpture decoration had been found or not. Mr. Crace had referred to Dr. Evans's paper on Knossos, carrying them back to something like eighteen centuries before Christ. The slides shown of plaster figures discovered there—one of a bull's head, another showing part of a human figure of extraordinary power in modelling—revealed a refinement of which they had hitherto no conception. A large number of decorative details in stucco were also employed throughout the palace; it was in fact the chief means used for decorating the interior. In the representations of the capitals of the columns which were shown, on what was known as the Temple Fresco, he had been told that there was only one way in which they could have been formed, and that was by stucco mouldings round them. Some of the most interesting examples Mr. Crace had shown

were from Rome, and these might be greatly extended, because the series of buildings found in the Baths of Titus, in the various tombs in Rome, and in the villa of Hadrian at Tivoli, were of extraordinary beauty. He had recognised, in a book lately published, one or two ceilings he had himself sketched in earlier days but had forgotten where they came from; and in looking over them again it occurred to him that the work was infinitely more beautiful when on a curved surface or on a vault. Adam copied all the ceilings he came across in Rome and at Tivoli, but his reproductions had always been on flat ceilings; and they never produced the effect that they did on the vaults in Rome. Looking at these flat ceilings, he always felt that there was a tendency to sag. He could not help thinking the effect would have been much finer in the English ceilings if there had been a slightly curved surface. Even in the Adam series one occasionally found segmental ceilings; but we seemed to have given them up entirely. He had himself once or twice been able to do it on semi-domes, and the decoration at once lent itself to the expanse of the vault. In showing them the series of beautiful friezes with Mohammedan decoration, Mr. Crace had said it was eminently plaster-like in its treatment of the design of the figures in that material. As a curious illustration of that, the most successful court in the Crystal Palace was the Alhambra Court, done by Owen Jones; it was the closest resemblance ever made. To form the vault there only eight moulds, he believed, were required, and Owen Jones had reproduced that extraordinary ceiling with consummate skill. It was this keeping the material to its proper use which made the Alhambra the beautiful structure it was. Mr. Crace had shown a figure of that famous work of Michelozzi's at San Eustorgio, Milan, and it might be interesting to members to know that it was deemed so beautiful that they had had a small model made of it at South Kensington. Anyone going to the square room there would see the effect of these beautiful figures. They were meant to be seen from the floor, and were more beautiful when seen from below. There had lately been published in the *Burlington Magazine* a very fine bronze recently discovered behind a picture in the Wallace Collection. It probably dated from the sixteenth century, and was the same sort of figure that Michelozzi had employed in his figures in the frieze above referred to. There was a very fine ceiling at the top of the staircase in the Dolphin Hotel at Southampton, which was quite worth going to see when in that town. They had of course a great affection for Robert Chambers and his work. There were some magnificent ceilings in Somerset House. Being anxious to see the rooms that were occupied by the Royal Academy from 1780 to 1838, he got permission to go

over them; and to his delight he found the ceilings almost intact. They were extremely interesting because they were decorated by many of the members of the Academy, and were all set out and designed by Robert Chambers. He was sure they were extremely obliged to Mr. Crace for the great trouble he had taken—he had had to ransack the records of so many countries to get his views; and he could not have done better than give such an interesting and comprehensive *résumé*, so that they might see what the value of plaster had been in ancient times, and the extraordinary advantage it suggested for future use. Of late the industry had been taken into account again, and at the Art Workers' Guild they had had one or two demonstrations when artists came and modelled the ceilings before the students. That sort of work should be encouraged. He felt certain there was a way open for a new development of plaster, and he hoped Mr. Crace's paper would turn the attention of the public to it, so that it would be employed in future.

MR. G. H. FELLOWES PRYNNE [F.], in seconding the vote of thanks, said the subject brought before them by Mr. Crace was intensely interesting. They who lived in England must be excused for thinking that they could not use this plaster and stucco work externally with much advantage. With our variable and damp climate, we find over and over again that cement, however well prepared it be, will flake off. The examples of exterior stucco or plaster work during the Victorian era had not been very encouraging. For that reason he supposed it had not been studied as a material to be used externally with much success in this country. Historically, of course, the very elements of their work told them how wonderfully this material was used in the very earliest days—even in some of the examples of the second century, which Mr. Crace had put before them, one could trace the models of Adam's own designs. They had, however, in the ancient work a simplicity, a grace, and a freedom that even Adam found it difficult to copy. Looking backward indeed, the old examples were almost overwhelming; they made them feel how far they had fallen behind those who had gone before. The examples, however, from the Alhambra and Tunis showed them so clearly what was the right treatment of plaster for internal decoration, that the paper was justified even on that account alone. When one remembered those wonderful ceilings overflowing with hanging fruit and vine, of the later Renaissance period, now so much copied in different designs, one felt that it was not the right treatment. It was beautiful in some ways, but not a design suitable for plaster. The earlier men—as at the Alhambra—seemed to have grasped the very elements of their material in getting their different surfaces; and in that respect we should endeavour to follow them. As regards

fibrous plaster, we were, to some extent, in advance of those who had gone before; for in this material our scope was very wide indeed. In fibrous plaster we were able to bring out in a light way some most beautiful effects: to get perfect modelling on to a very light surface. The heavy figures of the Renaissance period, or of the eighteenth or beginning of the nineteenth century, seemed to overweight a ceiling to a great degree, not only in appearance but constructionally; but with fibrous plaster the character of the construction was so light that there was no danger of this defect. In low relief work there was a large field open to them. Mr. Gerald Moira had put up some panel decoration in the Trocadero which were richly suggestive of what might be done in low relief. With ornament of that character, with figures lightly coloured, with the colours washed over, and not over-decorated, there was a large opening for effective decorations, especially with large spaces, where mural decoration might be employed.

MR. W. AUMONIER, referring to the plaster work in Rome Mr. Crace had spoken of, said he saw it a little while ago, and it struck him as being some of the most beautiful he had ever seen. It showed absolutely the free touch of the hand. He and his companions had studied it very closely, and tried to find out the method of working it. He did not think they came to a conclusion, after all, whether the work was begun by applying plaster to the surface and then adding to it by degrees, and working it in that way. If so, it was wonderful the way it had stuck to its ground, because there it remained perfectly sound, showing no tendency to come away. The wonderful modelling, apparently nearly all with steel tools, especially struck him; the whole work was very beautiful indeed. With regard to the Elizabethan ceilings, which Mr. Crace seemed to think suffered from defective work, he did not quite agree with him. Let them imagine those ceilings with the

mouldings absolutely worked through with the stipple, or, if they were wooden mouldings worked very true indeed, with that moulding put between them they would not look half so well. What made the beauty of those ceilings was that it was all handwork. Both moulding and modelling had been worked by hand; and all was in harmony. He did not mean to say that defects were not a fault; but it was a thousand times better with those defects than if the mouldings had been worked mechanically, and the ornament had been modelled by hand, thus giving a quite different character to each part.

MR. CRACE, in responding, replied to points raised during discussion. With reference to what Mr. Spiers said as to the value of curved surfaces and sections for fine ornament, he quite agreed that a very low relief was always seen to better advantage on a curved surface; the slight play of light and shade took away the hardness of edge, and gave something of the charm of the variable light on the landscape. At the same time they must not run away with the idea that artistic merit was to be caught up by placing it in particular positions, or under particular circumstances. Adam's ornament, excellent and effective as it was, was not to be spoken of in the same breath as the beautiful little low relief he had shown from Rome [fig. 1]. The one was a mere mechanical reproduction from the model; the other showed from end to end the touch of the artist's hand. Mr. Fellowes Prynne had spoken of stucco or cement as not being suitable for external use in this climate. He (Mr. Crace) did not know that he was prepared to advocate it; but the question having been raised whether the palace of Nonsuch was ever decorated with plaster panels—he simply wanted to show that the argument that nobody would have been so foolish as to use plaster was a very foolish argument, because so many people had done it, and the work remained to this day.

SMOKY CHIMNEYS.

By HASTWELL GRAYSON, M.A.Cantab. [A.].

Read before the Liverpool Architectural Society, 18th January 1904.

THE art of building had advanced a very long way before our ancestors found chimneys necessary. Even then they were content for a century or so with a flue from the kitchen and one from the hall. Modern ideas of comfort, not to mention the Building By-laws, make it necessary to provide every room in the house with a fireplace. We burn coal which produces a dirtier smoke, with a more disagreeable smell, than wood; we have far more curtains, carpets, and upholstery to be spoiled by a faulty flue, and yet twentieth century science can teach very little about building chimneys. It is indeed patent to everyone that the more costly an edifice and the more valuable the site on which it stands, the more difficulty is there in getting rid of the smoke. Walk down Castle Street and count the "tallboys," and then walk down one of those tiny byways christened by their owners "avenues," that spring up by the dozen in the suburbs, and you will see that in flue construction architects know just as little as jerry-builders. This ignorance is especially exasperating, because a more accurate knowledge of materials and methods of construction has filled up the pitfalls of a previous generation. Improvements in concrete, in lightning conductors, and in damp-courses, are instances; dry-rot is rapidly ceasing to be a bugbear. But no architect can guarantee to build flues that will draw in all weathers and under all circumstances. Lord Bacon commences his delightful essay on "Building" with the sentence: "Houses are built to Live in and not to Looke on; Therefore let Use be preferred before Uniformitie; Except where both may be had. Leave the Goodly Fabrickes of Houses, for Beautie only, to the *Enchanted Pallaces* of the *Poets*; Who build them with small Cost." But all sufferers will agree that no home is fit to "live in" if the chimneys will not draw. This Paper will only recapitulate well-worn theories, and will not provide a patent medicine to prevent or cure that deadly malady, a down-draught.

The principle of a flue is simple. Smoke consists of warmed air charged with particles of matter, either wholly or partially consumed. The warmth makes it lighter than the atmosphere, and therefore smoke rises by the easiest way, which should be up the flue. The trouble begins when the flue is imperfect, inadequate, or when other forces are at work counterbalancing the natural tendency of the smoke to rise. Failure may show itself in two ways—there may be a

steady down-draught, or the upward draught may be so sluggish that puffs descend occasionally. The first is more usual when the fire is just lighted or nearly out. In either case, the nuisance may be accentuated by wind or the absence of it.

The chief cause of smoky chimneys is the lack of air supply at the base. A cubic foot of fresh air must be provided for every cubic foot of smoke that passes up the chimney. Nature allows considerable elasticity to air, but "abhors a vacuum." The Royal Commission on the Ventilation of Factories, after making experiments, ascertained that an ordinary fire in an ordinary room sent 4,000 cubic feet of smoke up the flue per hour, and that, after hermetically sealing the windows and doors, the same flue drew 3,000 cubic feet per hour. Before seeing this fact quoted I had made some personal observations of the smoke discharged through the chimney-pots above an office building: it seemed to me that the velocity was five feet a second in still weather. As the diameter of the flues was about 7 inches, the volume of smoke discharged would be 4,500 cubic feet per hour, or equal to the capacity of a room 15 feet broad, 25 feet long, and 12 feet high. I do not believe that in a substantial building 3,000 cubic feet of air per hour could be produced with windows and doors hermetically sealed, unless the air came down one half of the chimney and the smoke went up the other half. It is well known that buildings with thick walls and fireproof floors, such as blocks of flats or offices, are most liable to down-draught. These blocks have great numbers of fires lighted daily. They have very few outside doors, and a special effort is made in them to keep the windows and internal doors draught proof. In a comparatively small office building, with the only entrance protected by heavy swing doors, there may be 30 or 40 grates in constant use, every one of which should have its 4,000 cubic feet of air per hour. This supply is impossible unless special means are adopted to provide it. In an airtight building time is often the architect's ally; for every minute settlement and every infinitesimal shrinkage provides an additional air inlet. But buildings specially constructed should have special ventilation. Even then some flues will smoke, because tenants persist in closing up the inlets. Warmed fresh air is almost unprocureable; of all the warm-air stoves in the market I do not think that one can produce 25 per cent. of the air which it consumes, and most of them dry

the air too much and warm it in an inaccessible chamber. Anything in the nature of a plenum system is costly to maintain, and even more costly to instal. - Architects, therefore, can only supply fresh air from the outside, and trust that the tenants will use the inlets. But tenants, more often than not, consider fresh air a draught and ventilators an unnecessary fad. Air inlets are least objectionable when near the ceiling, as that position allows the fresh air partially to lose its chill before reaching the occupants of the room; high inlets are also useful as outlets, when the fire is not lighted. The best form seems to me to be a "hit-and-miss" grating (very neat ones can be obtained now, made of aluminium) at the side of a chimney breast into a flue that finishes just above the roof, with cast-iron gratings on opposite sides. I have several times seen air inlets brought close to the grate—in one case the air was led into a copper curb perforated at intervals; the arrangement was ingenious, but in practice was not a success, as the air whistled out and blew the ashes about the room. Inlets direct through the wall, on the old Sherringham principle, are generally inconvenient, unless the room has two outside walls; otherwise the best lighted and most valuable space becomes the most draughty. Fanlights and ventilators through internal walls are more likely to be used. A contractor who has built many offices once advised me to have doors very close fitting at the floor, but very easy at the top, and with the rebate of the frame cut well back. By doing this a concealed inlet can be provided 3 feet long by $\frac{1}{2}$ inch deep, equal to 9 square inches. This device has extra value when the hall or corridor is warmed.

For years, when opening the front door on a winter evening, it puzzled me to find out what became of the immense volume of chilly air which came rushing in. Two or three hundred feet entered per second, but the house seemed able to absorb it indefinitely. The answer is that the flues drew up a greater quantity, and the cold heavy air from the outside drives the lighter air in the house out by every ventilator and crevice that was acting as an inlet before the door was opened. To repeat, a flue, no matter how carefully constructed, does not have a fair chance unless an adequate air supply is introduced through the ceiling, floor, outside or inside wall.

Given an air supply, the next consideration is the flue. The majority of architects and builders feel certain that a 14×9-inch flue is much too large; and the proportion is stupid. The opening at the junction of the grate and the flue is seldom 36 square inches, and often much less. Chimney-pots vary in area from 40 to 60 square inches. Therefore, why so many by-laws insist on over 120 square inches for the flue is incomprehensible. A 9×9-inch flue can be more thoroughly cleaned, and works well enough

in districts where the by-laws permit. A 9-inch flue-liner has an area of about 60 square inches, and a 10-inch flue-liner of 78 square inches; my experience seems to show that they whisk the air away much more quickly than a parged 14×9 inch flue, in spite of its greater area. Liners fail to hold soot, which is continually falling down into the fire; and with no fire they make a down-draught smell very strongly of soot. The absence of corners seems to invite a down-draught, or else the smoothness tends to make the upward action in some flues so strong that they pull from others. Parging is a non-conductor, but has little value, and is seldom permanent.

Chimney-pots have this in common: the more efficient the uglier; but the reverse is not as true as potmakers would have us believe. Pots with the ordinary zigzag rim cause an up-draught much as the V in the body of a kite forces it up. Louvres, trumpet-mouths, spirals, and many other horrors force up the smoke when the wind blows; but even an Archimedean revolving cowl or a lobster-back is useless in still weather. Trumpet-mouthed blowers, or drain-pipes with the socket outwards, built into a stack at an angle of 45 degrees a few feet below the pot, will sometimes cure a flue that is only troublesome when the wind is in one particular quarter.

The value of at least two bends is always insisted on in specifications, but in practice the bends are often scamped, and are difficult to provide in the attics, especially when the fireplace comes between other flues. The reason for the undoubted advantage of bends is not obvious. The contraction which is usual in making them may have something to do with it; they may act slightly as baffle-plates, and, of course, the top bend catches the rain and helps to keep the lower part of the flue dry; probably under various atmospheric conditions all these reasons may have some truth in them.

The height of the chimney-stack is of the greatest importance; but again the reason is not obvious. When the wind blows at right angles to the ridge, the velocity must be greater nearer the ridge, and probably steadier. When the wind is not at right angles to the ridge, I cannot see how it can affect the flue. If the straightness of the flues in the chimney-stack above the roof helps the force of the smoke, it is curious that bends should be useful below. There can be no appreciable difference in temperature or atmospheric pressure at the top of two flues, one of which is five feet higher than the other; yet we know that five feet extra height to a stack may work wonders. That it is advisable to keep a flue warm is more obvious, for as soon as the smoke approximates in temperature to the atmosphere its tendency to rise is lost. All outside stacks should have 9 inches of brickwork between the flues and the weather. Single flues should be avoided, and above the roof

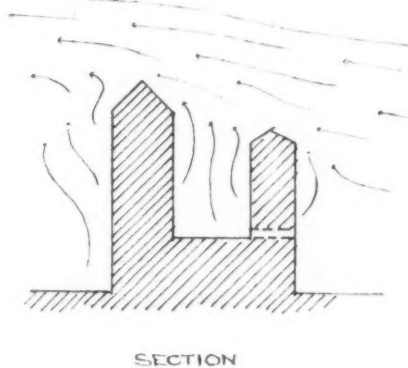
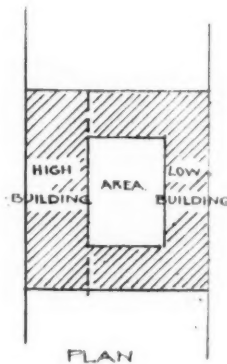
it is better to have 9 inches of brickwork on the most exposed side and end, even if there is only $\frac{1}{2}$ round the rest of the chimney.

The plan of a stack and the direction of the wind seem to have no connection. A chimney much exposed to a west wind is just as likely to be satisfactory with its axis north and south as east and west. It is better to have the middle pots in a long stack raised a little above those at the ends, but the flue at the leeward end is just as likely to draw well as that at the windward.

We frequently hear it stated that on account of other buildings, trees, or mountains, the wind is deflected and rushes down vertically on to some unfortunate flue and drives the smoke back to the grate. That argument, I believe, is generally false. A strong wind acts on the principle of an hydraulic jet pump, or one of those little sprays for fixing a pencil sketch. It drags after

to the rooms. It was found in an important Liverpool building designed on these lines that the flues on the floor level with the bottom of the area smoked, but none of the others. Most buildings are not so fortunate, as a vacuum generally sucks impartially from all rooms round the area. An air trunk in the position shown by the dotted line would probably allow the vacuum in the area to be filled direct from the street and save the down draught.

Architects are frequently asked how it was that the old straight flues seen in mediæval work carried off the smoke. They were built to act as bacon-curers almost as much as smoke outlets, were perfectly straight, and large enough to be hand-swept by a grown man. My private belief is that they often did not draw (of course the smoke from a log fire is cleaner and less objectionable to our eyes and nose than coal smoke); but if they did



it the air on the lee side of an obstruction and tends to create a vacuum. All gardeners know that against a wind a hedge affords more protection than a wall. They believe that the wind swoops straight down on to the beds from the top of the wall. It does nothing of the kind. The wind goes rushing onward and creates a vacuum on the sheltered side, which air whirls eddying in to fill; the eddies destroy the plants. A hedge allows air to pass through the base and the eddies are avoided. It is the same with buildings; a strong wind sucks out the air from the sheltered corners. If the air that replaces it comes from the inside of the building the chimneys will smoke. A vacuum is especially likely to occur in a cul-de-sac, or an area with buildings on all sides. Take a plan as sketched, an oblong building with an area, and the block on one side rather lower than the others. If a strong wind blows directly on to the low roof, it will bound on to the high one and create a vacuum in the area. Should the gust be prolonged, air will rush out through the crevices in the walls and windows and transfer the vacuum

draw we may suppose that in those days people were less sensitive to draughts, and did not stint the supply of air to the grate.

It is a mistake for the public to ask an architect to cure a faulty flue. Alteration at the base is very seldom allowable—in the flue itself impossible; all that can be done is to raise the stack or crown the flue with somebody or other's patent cowl—and that is not architecture. Some day galvanised-iron cowls will be prohibited by the local by-laws. The life of the best and heaviest is not ten years—the stays will not last as long; thin cowls become a source of danger to the neighbourhood before three years are out; they are fixed in such a position that supervision is impossible. Many a fine building is ruined by them. To look at Piccadilly across the Green Park is really distressing. It is almost as bad to walk up South Castle Street and view the skyline of the North and South Wales Bank. But until we become learned in vacuums and acquainted with the science of draughts and air-currents, the cowl-making business will be ever increasing and ever prosperous.



9, CONDUIT STREET, LONDON, W., 19th March 1904.

CHRONICLE.

The late Dr. A. S. Murray [H.L.].

The formal announcement of Dr. Murray's death was made to the General Meeting last Monday by the Hon. Secretary, Mr. Alex. Graham, F.S.A., in the following terms:—I have to announce with very deep regret the decease of a highly esteemed and distinguished Honorary Associate, Dr. Alexander Stuart Murray, Keeper of Greek and Roman Antiquities at the British Museum. I am sure that no words of mine can strengthen the expression of opinion as recorded in the daily papers of the meritorious career of Dr. Murray. As architects we are under a debt of gratitude to Dr. Murray for his kind services and his co-operation with us in matters in which he was a master. He was acquainted with almost every branch of classic archaeology, and in one branch particularly, that of Greek sculpture, he was an authoritative exponent. I need say nothing with regard to his literary achievements: they must be known more or less to all of you; but I may say this, that in nothing that Dr. Murray ever put his hand to did he fail to achieve success. As a close reasoner and a thoughtful observer he belonged to a type of students that seems to be diminishing in numbers rather than increasing. And it is for that reason that we deplore the loss of so distinguished a *savant* as Dr. Murray. Many of us who have come in contact with him, not only here but in his official capacity at the British Museum, had good reason to look upon him not only as a friend, but as an adviser who was always ready to impart information on the many subjects of which he was a master. To us especially Dr. Murray will remain a pleasant memory, and members of the Institute who have seen him here, where he was a familiar figure on so many occasions, will always think of him as a kind friend and as a learned man. I need scarcely say that with that pleasant memory we cannot do less as an Institute than record our feelings by a sympathetic letter to his widow and relatives, in slight recognition of the kind services he has rendered to us, and in appreciation of his labours

in the cause of classic archaeology. I therefore ask you, gentlemen, to be kind enough in silence to approve of a letter being sent to his relatives expressing our feelings at the loss of so good and learned a scholar.

Alexander Stuart Murray was the eldest son of the late George Murray, and was born near Arbroath, in Forfarshire, on the 8th January, 1841. He was educated at the Royal High School of Edinburgh and at Edinburgh University, and was for some time a student at the University of Berlin, attending there the lectures of Boeckh and of other scholars of the heroic age. In February 1867 he was appointed Assistant in the Department of Greek and Roman Antiquities in the British Museum, and succeeded Sir Charles Newton as Keeper of the Department in 1886. Under his editorship and superintendence were issued a considerable series of catalogues and other publications dealing with the collections of his department. Volumes were also issued on the Greek inscriptions, the terra-cotta sarcophagi, the excavations in Cyprus, and certain groups of the vases. His chief unofficial works were a *Manual of Mythology* (1873), *History of Sculpture*, 2 vols. (1880, 1883), *Handbook of Greek Archaeology* (1892), and *The Sculptures of the Parthenon* (1903). Dr. Murray himself took part in the excavations at Cyprus, which brought to light the burying-ground of the original Greek settlers, and produced for the Museum a rich collection of dress ornaments in gold, ivory carvings of much artistic excellence, and pottery rivalling in interest and importance Schliemann's famous finds at Mycenæ. An account of them was given in a Paper read by Dr. Murray before the Institute in November 1899. Dr. Murray was elected an Hon. Associate in 1890, and had served on the Literature Committee since 1892. The following Papers read by him before the Institute have been published in the *JOURNAL*:—"The Sculptured Columns of the Temple of Diana at Ephesus" (*JOURNAL*, 21st November 1895); "Excavations in Cyprus" (*ib.*, 25th November 1899); "Two Ionic Capitals in the British Museum" (*ib.*, 11th January 1902); "A Fragment of the Parthenon Frieze" (*ib.*, 22nd November 1902). The Institute was also indebted to Dr. Murray for many contributions to the *JOURNAL* in the shape of reviews of books on his own special subjects.

Dr. Murray died, after a short illness, on Saturday, 5th March. He had just completed a course of lectures on Ancient Sculpture to the students of the Royal Academy, the last being delivered by deputy on Thursday, the 25th ult. At his funeral at Kensal Green the Institute was officially represented by the Secretary.

The Architects' Benevolent Society.

The Annual General Meeting of the Architects' Benevolent Society was held on the 10th March

1904, in the rooms of the Institute, 9, Conduit Street, Mr. Aston Webb, R.A., President, in the Chair. The Report of the Council was submitted and adopted as follows:—

"In presenting their Fifty-third Annual Report the Council have great pleasure in stating that the work of the Society has been well maintained in spite of many adverse circumstances. The country has not yet recovered the severe strain put upon it by the late war, which has naturally crippled the subscriptions to most charitable objects. Nevertheless this Society has had during the past year a small increase in its subscriptions, but it has also had a corresponding drain upon its resources, so that at the end of the year the Treasurer finds he has only a small balance in hand. The claims that have been made upon the Society during the past year have been very urgent, and in some cases, from architects who were formerly in good practice, but who, through sickness or other causes, have found themselves unable to continue their work.

"Gratitude has been described as a sense of favours to come; but happily this is not always true, as is evidenced *inter alia* by the following letter received by the Secretary from the nephew of a lady (the widow of an architect) who had on many occasions been assisted by the Society:

" 26th June 1903.

"DEAR SIR,—I regret to inform you that Mrs. — passed away on Thursday morning at 8 o'clock on June 25th; she left a written request that I should write and thank you for your great kindness to her in her adverse circumstances. She wrote down the following words on June the 10th: "I thank each one with my whole heart, and pray that God will bless them and keep them, and reward them a hundredfold for their goodness to me, who have ministered to my necessities, and have made my last years on earth so truly comfortable."

"I remain yours respectfully,"

"The Council regret the loss through death of the following subscribers:—Mr. J. F. Wadmore, Mr. Francis Edwards, Mr. Herbert Ford, Mr. Henry Saxon Snell, and Prof. T. Roger Smith.

"The total amount of subscriptions received during the past year is £554. 16s., and the pensions and grants amounted to £830. 2s. 6d.

"The following gentlemen retire by rotation from the Council:—Mr. Sydney Smirke, Mr. H. L. Florence, Mr. Graham C. Awdry, Mr. J. T. Christopher, and Mr. F. T. Baggallay.

"To fill the vacancies caused by these retirements the Council desire to nominate Mr. T. E. Colcutt, Mr. Rowland Plumbe, Mr. G. T. Hine, Mr. Wm. Grellier and Mr. Ambrose Poynter.

"The Balance-sheet and Income Account for the year ended 31st December 1903, audited by

Mr. Henry A. Hunt and Mr. Edmund Buckle, are submitted.

"The sincere thanks of the Society are due to the R.I.B.A. Council for the use of their rooms, and Mr. Locke and the other officials have rendered material assistance which is cordially appreciated.

"Donations have been received from the following gentlemen:—Mr. Graham C. Awdry, £25. 10s.; Mr. F. T. Baggallay, £10. 10s.; Mr. John T. Christopher, £5. 5s.; Mr. Percivall Currey, £5. 5s.; Mr. Ambrose Poynter, £5; the Tylers' and Bricklayers' Co., £5. 5s.; Mr. H. Walter Lonsdale, £5. 5s.; Nottingham Architectural Society, £5. 5s.; Mr. Aston Webb, R.A., £5; Mr. F. W. Tasker, £5. 5s.; Mr. H. Cheston, £5. 5s.; and Mr. David Morgan, £5. 5s., &c."

The President, in moving the adoption of the Report, drew attention to the remarkably low cost of working the Society; it hardly came to ten per cent. of the receipts. He called attention to the fact that the members of the Royal Institute numbered 1,830, and out of that number only 350 were subscribers to the funds of the Architects' Benevolent Society. The architects practising in the United Kingdom numbered over 4,000. The Society was not an Institute Society; it was for all architects, and it helped anyone, the only requirement of applicants being that through no fault of their own they had fallen into distress. All architects ought to unite in the education of the young and in helping the aged, the infirm, and the unfortunate. The stock-in-trade of an architect was very small, consisting of his brain and senses, and if one or other failed he fell into want. During the year £211 had been granted to ten pensioners, and £618 had been distributed among fifty-four applicants for relief. The subscriptions of the Society, amounting to £554, showed an increase as compared with last year, but the donations only amounted to £96 12s.—the worst year in this respect for a long period. The applications had extended from Dublin to South Africa, and he thought they had a right to ask all architects for support. A large majority of the supporters came from London, and the applications for relief mainly from the country. Many well-known architects' names were not to be found on their list, but he hoped they would join.

The Report having been adopted, the Council were elected on the proposal of Mr. Macvicar Anderson; Mr. W. Hilton Nash and Mr. Percivall Currey were re-elected Hon. Treasurer and Hon. Secretary respectively; and Mr. Henry A. Hunt and Mr. John T. Christopher were elected Auditors.

Liverpool Cathedral.

At the Liverpool Architectural Society on the 7th inst. Mr. G. Gilbert Scott, joint architect of the Liverpool Cathedral, gave an address explanatory of the cathedral, and exhibited drawings of the building to be erected on St. James' Mount.

Mr. Scott explained that in preparing his design he decided that solemnity was to be its keynote, and this included dignity, grandeur, and simplicity. The whole effect at which he aimed was to be produced by the massing, grouping, and proportion of the various parts. No amount of rich ornament could, to his mind, equal the beauty and charm of a blank wall relieved by a touch of rich detail. This lack of blank wall was, perhaps, the least satisfactory feature of our fine old cathedrals. In designing a modern cathedral the first thought that occurred was how to treat the central space. He felt convinced that the central space must be so designed as to form the predominating feature of the cathedral, both inside and out, and the planning and designing of this important part was the first difficulty to be got over. He was compelled, however, to abandon the idea of treating a large central space satisfactorily, but he still felt that whatever form the central feature ultimately took, it must, above all things, be the crowning feature of the exterior, so that the eye would be carried up from the less important parts to it, the latter in their turn giving scale and, as it were, supporting the central pile. The actual floor area of the central space, as now planned, was not less than the area of the octagon at Ely, which fact helped them to realise that the space at the crossing was not so small as was commonly imagined. Some had remarked that the central space would be very dark; but they had evidently not noticed the four windows which opened directly into the central space. The great windows at the end of the tower transepts would play an important part in the lighting of this space. The adoption of the cross transepts in the nave and choir was not decided on merely because the idea was novel, but originated from a feeling that the Byzantine and Renaissance form of vaulting, namely, with domes and barrel vaults, was a far more impressive and dignified way of roofing a space than the intricate and fanciful, though no doubt beautiful, vaultings of Gothic work. All the mouldings, etc., were being designed by Mr. Bodley. The red sandstone to be used lent itself to large and simple mouldings, and it was fortunate that this stone was especially adapted to a type of moulding which would be thoroughly in character with the rest of the building. The original intention of having a great western court flanked by cloisters had been abandoned owing to the limitations of the site. Unfortunately there was no direct approach to the west end. If they could have arranged a fine road leading from the west front it would have been easy to get such a fine feature as suggested, with steps running the full width of the court from cloister to cloister. Although the site had several faults, it was on the whole a very fine one; it possessed a feeling of romance, which he hoped would be increased when the vast pile was completed.

ALLIED SOCIETIES.

LEEDS AND YORKSHIRE SOCIETY.

The Sketching Excursions of the Birmingham Association.

The eighth general meeting of the above Society was held on Thursday, 10th March, Mr. Butler Wilson [F.] presiding. Amongst those present were Messrs. Richard Wood, G. F. Bowman, W. H. Thorp [F.], H. S. Chorley [A.], H. A. Chapman [A.], W. G. Smithson [A.], Robert P. Oglesby, Percy Robinson, G. E. Reason, and others. At the conclusion of the customary business, which included the nomination of officers for the ensuing session, a paper on "The Sketching Excursions of the Birmingham Architectural Association" was delivered by Mr. C. E. Bateman [F.], and illustrated by 150 fine lantern slides prepared by Mr. John Ward. These views covered most of the ground traversed during the ten years of these annual excursions, and a map was exhibited indicative of the various centres of operation, which included the following:—Broadway, Ludlow, Oxford, Tewkesbury, Cambridge, and Ely, Cirencester, Stamford and Peterborough, Burford, Banbury and Kettering. A vote of thanks was tendered to Mr. Bateman and Mr. Ward on the motion of Mr. H. A. Chapman [A.], seconded by Mr. H. S. Chorley [A.], and supported by Mr. Robert P. Oglesby, who elicited from the lecturer some practical details with regard to the conduct of these excursions with a view to similar excursions being instituted by the Leeds Society.

MINUTES. X.

At the Tenth General Meeting (Ordinary) of the Session 1903-04, held Monday, 7th March 1904, at 8 p.m.—Present: Mr. Alfred Darbyshire, F.S.A., *Vice-President*, in the chair, 13 Fellows (including 6 members of the Council), 29 Associates (including 1 member of the Council), 2 Hon. Associates, and numerous visitors: the Minutes of the Special and Business Meetings held 29th February [pp. 251-2] were taken as read and signed as correct.

The Hon. Secretary announced the decease of Joseph William Twist (Bloemfontein), *Associate*, elected 1891.

The Hon. Secretary also announced the decease of Dr. Alexander Stuart Murray, *Hon. Associate*, and having referred to his eminent services to classical archaeology and to the esteem in which he was held by members of the Institute, it was Resolved that the regrets of the Institute be recorded on the Minutes, and that a letter of sympathy and condolence in their bereavement be sent to his widow and family.

The following members attending for the first time since their election were formally admitted by the Chairman—viz. Arthur Edward Bartlett and Henry Winter Johnson, *Fellows*; Thomas Frank Green, Andrew Rollo, Thomas Henson Robinson, and George Leonard Russell, *Associates*.

A Paper by Mr. J. D. Crace [H.A.] on PLASTER DECORATION having been read by the author, illustrated by lantern slides, and discussed, a vote of thanks was passed to Mr. Crace by acclamation, and briefly acknowledged.

The proceedings then closed, and the Meeting separated at 10 p.m.

e
e
i
y
f
e
.
a
s
e
o
f
l
-
s
n
d
r.
t
-

n
-
n
).
n.
ne
p.
h
r.
ag
ry
of
ne
of
to
ne
r-
er
o,
ll,
A-
rn
to
ed